

What is Claimed Is:

1. A composition comprising an isolated human polynucleotide from human brain selected from the group consisting of:
  - 5 (a) a polynucleotide comprising the potassium channel Kv4.3 nucleotide sequence set forth in SEQ. ID NO. 1 or in SEQ. ID NO. 3, deposited under accession number ATCC -\_\_\_\_\_;
  - (b) a polynucleotide having at least 90% identity over its entire length to a polynucleotide encoding a potassium channel Kv4.3 polypeptide of SEQ
  - 10 ID NO: 2 or SEQ ID NO: 4;
  - (c) a polynucleotide which is an allelic variant of the polynucleotide of (a)-(b) above; and
  - (d) a polynucleotide capable of hybridizing under stringent conditions to any one of the polynucleotides specified in (a)-(c).
- 15 2. An isolated DNA molecule encoding a Kv4.3 potassium channel polypeptide having the amino acid sequence set forth in SEQ ID NO: 2 or SEQ ID NO: 4.
3. The isolated DNA sequence of claim 2, having the nucleotide sequence set forth in SEQ ID NO: 1 or SEQ ID NO: 3.
- 20 4. The polynucleotide of claim 1 wherein said polynucleotide is operably linked to at least one expression control sequence.
5. A host cell transformed with the polynucleotide of claim 1.
6. The host cell of claim 5 wherein said cell is a prokaryotic or eukaryotic cell.
- 25 7. A process for producing a Kv4.3 potassium channel polypeptide comprising the steps of introducing the polynucleotide of claim 1 into a host cell, growing a culture of the host cell in a culture medium so that said host expresses the Kv4.3 polypeptide, and purifying the polypeptide from the culture medium or host cell.
- 30 8. A polypeptide produced according to the process of claim 7.
9. A Kv4.3 polypeptide comprising:

(a) an amino acid sequence which is at least 95% identical to the amino acid sequence of SEQ ID NO: 2; or

(b) an amino acid sequence which is at least 95% identical to the amino acid sequence of SEQ ID NO: 4.

5           10.     A Kv4.3 polypeptide comprising an amino acid of SEQ ID NO: 2 or SEQ ID NO: 4.

          11.     An oligonucleotide which encodes an antisense sequence complementary to a portion of a human Kv4.3 potassium channel sequence of SEQ ID NO: 1 or SEQ ID NO: 3 and which inhibits expression of the human Kv4.3 gene.

10           12.     An antibody immunospecific for the human Kv4.3 polypeptide of claim 9.

          13.     A method for diagnosing a disease characterized by aberrant expression of human potassium channel Kv4.3 polypeptide of claim 9 comprising (a) incubating a sample indicative of the aberrant expression of the human polypeptide  
15 with a reagent comprising a polypeptide comprising a region at least 90% identical to the amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 4 under conditions effective for specific binding of said reagent to said human polypeptide; and (b) determining the binding of said reagent to said peptide in the sample.

          14.     A diagnostic process comprising analyzing for the presence of a  
20 polynucleotide of claim 1 in a sample derived from a host.

          15.     A method for identifying compounds which modulates the activity or expression of a human Kv4.3 polypeptide of claim 9 comprising (a) incubating a sample comprising Kv4.3 polypeptide in a test medium containing said test compound and a reagent comprising a polypeptide comprising a region at least 90%  
25 identical to the amino acid sequence of SEQ ID NO: 2 or SEQ ID NO: 4 under conditions effective for specific binding of said reagent to said Kv4.3 peptide; (b) comparing the binding of said reagent to said peptide in the sample in the presence and absence of said test compound; and (c) relating the difference between the binding is step (b) to the test compound regulating the activity of the Kv4.3  
30 polypeptide.

          16.     A transgenic or chimeric animal comprising the polynucleotide of claim 1.